Impacts between pedestrians and motor vehicles usually have serious consequences for the pedestrian. Many individuals and groups have studied the topic of determining vehicle speed from pedestrian post-accident data. For the most part, each group which has analyzed the data sufficiently to have published a report of findings, conclusions, opinions, and/or formulas seems to have arrived at a different formula with different ranges for the various parameters. For the most part, however, and quite interestingly, by comparing the conclusions reached by applying the methods and parameters from one group to conclusions reached by applying methods and parameters from another group, using the appropriate ranges for those parameters as specified by each respective protocol, the answers will usually be quite similar. But substituting another range for parameters into the formula developed for a particular protocol will often provide an invalid answer. The arithmetic works, but the answer is wrong. So, what method is best? The answer generally is "Whichever method you're using." Properly applied, most of the current methods and protocols will produce very similar results.

Evaluation of vehicle speed at the time of a pedestrian impact generally requires some extent of physical evidence. Often, a vehicle will leave visible skid marks before and/or after impact with a pedestrian. In those cases, evaluation of the vehicle's speed is simply a straightforward application of the skid-to-stop formula. Impacts with pedestrians can cause very small (one to two mph) speed losses in cars and light trucks, but those losses are inconsequential compared to the vehicle's speed. The point of impact with the pedestrian may be determinable, at least within a matter of inches or a few feet, by various means or methods. The sole(s) of the shoe(s) of a pedestrian may make one or more scuff marks on the pavement at the point of impact. Objects carried by or loosely attached to the pedestrian (a hat or cap, a folded newspaper or magazine carried under the arm, eyeglasses, etc.) will often be separated from the pedestrian at impact and fall to the ground within inches of the point of impact. If a vehicle began skidding, struck a pedestrian, then continued skidding to a stop, the point of impact must be known in order to calculate the vehicle's speed at the instant of impact. If you have total skid distance and don't need to know speed at impact, only the speed of the vehicle when it began skidding, knowledge of the precise point of impact is not necessary. Where you don't have skidding, however, other data points can help demonstrate the vehicle's speed. If you can determine the point of impact and the throw distance for the pedestrian, you can determine the pedestrian's post-impact speed, which will always be no more than the speed of the striking vehicle; in most cases, the throw speed will be somewhat less than the vehicle speed at impact.

Books have been written about pedestrian accident investigation; the purpose of this newsletter is to provide some basic ideas about what to look for and what to expect in reconstructing a pedestrian impact case. With that generalization in mind, there are some rules of thumb whose validity may vary with the size of the thumb. ☺ For adults who are struck by cars and light trucks at low speed, the pedestrian is likely to fall onto the hood or to fall forward, perhaps then to be run over by the vehicle which struck him. At higher speeds (25 to about 45 mph), the pedestrian will often strike and/or slide up the hood to the windshield; in the higher speeds in that range, the pedestrian is likely to make severe contact with the windshield. The pedestrian may continue over the roof and fall behind the vehicle, may penetrate the windshield and be trapped partially in and partially out of the passenger compartment, or may fall off to either side after the windshield impact. Impacts in that speed range generally result in very serious to fatal injuries to the pedestrian. At typical highway speeds, the pedestrian's legs may be severed. The pedestrian will typically pass over the striking vehicle, coming to rest behind it. It is rare when a highway-speed pedestrian impact is not fatal.

Determining who is really at fault may not be straightforward. Just because a pedestrian is struck in a crosswalk doesn't mean that the driver of the vehicle is at fault—the pedestrian may have stepped in front of a moving car which was too close to allow the driver to stop. Many cases involve pedestrians who entered a traffic lane from behind an object which was a visual obstruction to both the pedestrian and the driver. Obviously, a pedestrian has an obligation to look carefully before stepping into a path which may contain an approaching motor vehicle. But other cases involve drivers who were exceeding safe speeds and/or where inattentive to road conditions ahead of them. A driver who is traveling 45 mph in a 25 mph zone can't complain that a pedestrian 90 feet away stepped in front of him; that distance is not enough (in general) for a driver to take effective evasive action at 45 mph, but it is sufficient for an alert driver to come to a complete stop, if necessary, from a speed of 25 mph.

Pedestrian impacts at night often involve pedestrians wearing inconspicuous clothes. A bright red shirt may stand out in daylight but is very difficult to see at night. Most men tend to wear darker colors, particularly in their pants, with very little reflective element in any article of clothing. A pedestrian wearing dark clothes on an unlighted road may only be visible to the driver of a motor vehicle for 50 feet or less; one wearing white or very light clothes may only be visible for 120 feet or so. At 55 mph, 50 feet of travel takes 0.62 second; 120 feet of travel takes 1.49 seconds. Even 1.5 seconds may not be enough time to allow the driver of a car to take any effective evasive action to avoid striking a pedestrian in his path.

Perhaps the biggest problem involving pedestrian impacts is the pedestrian's impression that he is plainly visible. Even on an unlighted road, there is often enough light from stars, moon, and light pollution from houses or businesses or cities to allow the pedestrian to move about successfully. When the headlights of an approaching motor vehicle add to the ambient light, the pedestrian often perceives that the driver of the motor vehicle sees the environment as well as he does. But the driving environment is radically different visually. Tests with a large number of subjects of a wide range of age and driving experience have shown that drivers generally do not see pedestrians in dark clothing at night in sufficient time to avoid striking them.